

Missouri Department of Transportation Turns EPA Act Credits into Biodiesel

The state of Missouri Department of Transportation (MoDOT) found an innovative way to cash in on its excess alternative fuel vehicle (AFV) credits. MoDOT uses the Missouri Biodiesel Fuel Revolving Fund to bank funds earned from selling excess EPA Act credits and uses the money to offset the incremental costs of using biodiesel.

In fiscal year (FY) 2004, MoDOT's efforts to expand its biodiesel program resulted in the fleet's use of 804,693 gallons of B20 (20% biodiesel, 80% petroleum diesel). The department plans to continue to use the fuel and will expand its use of B20 to 75% of its diesel fleet by July 2005.

Under EPA Act, the Energy Policy Act of 1992, covered fleets can earn one biodiesel fuel use credit—the equivalent of one AFV acquisition—for every 450 gallons of neat biodiesel (B100) used. Most of the biodiesel used by MoDOT is B20 (2,250 gallons of B20 yields one credit). Blends of less than 20% biodiesel cannot be used to earn EPA Act credits. Biodiesel (B100) is considered an alternative and renewable fuel by the U.S. Department of Energy. It is on the list of EPA Act authorized fuels.

Fleet and Infrastructure Profile

MoDOT has 342 stations for dispensing diesel, including facilities in St. Louis and Kansas City. The B20 is used to operate backhoes, dump trucks, and heavy equipment as well as onroad vehicles, including several half-ton pickups. The MoDOT fleet has more than 4,000 vehicles, including 2,157 diesel vehicles.

In addition to its EPA Act requirements, MoDOT was required by a Missouri state statute to use B20 in at least 50% of its diesel vehicle fleet and heavy equipment by July 1, 2004. By July 1, 2005, MoDOT will be required to fuel at least 75% of the department's diesel vehicle fleet with B20. The statute applies only as long as the fuel is commercially available and the incremental cost of B20 is not more than \$0.25 per gallon. In recent months, MoDOT experienced incremental costs of \$0.30-\$0.40 per gallon, so it was not able to meet the target of 50% B20 use by July 1, 2004.



MoDOT's fleet includes 2,100 heavy-duty vehicles like this dump truck, which is fueled with biodiesel.

National Biodiesel Board

MoDOT Fleet Profile*

Vehicle Type	Fuel	Number of Vehicles
Cars/Station Wagons	Gasoline	65
Light-duty Trucks, Vans, and SUVs	Gasoline	29
E85 Flexible Fuel	Gasoline/E85	128
Dual Fuel and Dedicated CNG	Gasoline/CNG	3
Heavy-duty < 8,500 lbs.	Gasoline	1,117
Heavy-duty > 8,500 lbs.	Gasoline	469
Heavy-duty > 8,500 lbs.	Diesel/B20	2,157

* FY 2003

Today, all of MoDOT's eligible new light-duty vehicle acquisitions are AFVs, and, when possible, most of the AFVs in the fleet are fueled with compressed natural gas (CNG) or E85 (85% ethanol, 15% petroleum).



Strategies for Success

MoDOT fleet managers were required to overcome a number of barriers in order to achieve a strong biodiesel program. The greatest concern was the impact of biodiesel costs on the department's budget. As Jeannie Wilson, a fleet manager with MoDOT states: "We don't want to take money away from roads to pay for the fuels." The following innovative methods have helped MoDOT to achieve success.

Implement Innovative Funding

Because MoDOT management and state lawmakers were sensitive to the potential costs of using biodiesel, it was necessary to establish a funding mechanism to pay the incremental cost of biodiesel. On August 28, 2003, Missouri's legislature established the Missouri Biodiesel Fuel Revolving Fund for this purpose. The fund receives the payments from EAct credits sold by the state, which are generated through over-compliance with EAct requirements.

The money earned by selling EAct credits is then used by MoDOT to offset some of the incremental costs of purchasing biodiesel. In addition, funds raised by selling EAct credits can also be used to expand biodiesel infrastructure. The state has banked 280 credits and sold most of them using an outside vendor. The number of credits in the fund fluctuates as credits are banked and sold.

To date, the biodiesel revolving fund has received \$180,500 from the sale of 200 excess EAct credits. The excess credits were earned primarily by MoDOT through the purchase of more AFVs than required by EAct and the use of biodiesel.

Other Missouri agencies can also generate credits for the revolving fund. At this time, the Departments of Natural Resources and Corrections are generating credits, and the Department of Natural Resources manages the fund. Quarterly meetings allow department managers to discuss the fund's status.

Develop Strong Management Support

When MoDOT began developing its biodiesel program, department managers understood that there would be costs and challenges associated with using a new fuel. The managers, however, were committed to making the program a success. "Our managers have been supportive and dedicated. They've worked hard to make sure we have what we need to do this," Wilson says.

MoDOT managers cite the ease of using biodiesel, reducing petroleum consumption, and supporting Missouri farmers as incentives for the biodiesel program.

Biodiesel Basics

In 2003, U.S. net petroleum imports exceeded 11 million barrels of oil per day. Almost 24% of that imported crude oil is refined into heating oil and diesel fuel for use in U.S. trucks, boats, and heavy equipment. This provides us with an opportunity to displace a significant amount of petroleum by adding low levels of biodiesel to the diesel we use every day for transportation, industry, and recreation.

According to the Energy Information Administration, the United States consumed 36,599 gasoline-equivalent gallons of biodiesel in 2004.

Biodiesel is a renewable diesel replacement fuel that is manufactured from domestically produced vegetable oils, recycled cooking greases, or animal fats. To manufacture biodiesel, these fats and oils are chemically reacted with a short chain alcohol (such as methanol) and a catalyst to produce biodiesel and a glycerin co-product.

The most popular biodiesel blends are B20, which can be used for EAct compliance, and B5 or B2. Any diesel engine can operate on these blends without modification. When used in low-level blends of 5% biodiesel (B5) or below, biodiesel is transparent to the user. When biodiesel is used as B20, the user may experience very slight decreases in power, torque, and fuel economy, however these changes are usually not noticeable.

Biodiesel is available in all 50 states. There are an increasing number of retailers, petroleum distributors, and biodiesel distributors offering biodiesel blends. The National Biodiesel Board maintains a list of registered fuel marketers on its Web site at www.biodiesel.org.

Research has shown that substituting B100 for petroleum diesel reduces the life cycle consumption of petroleum by 95% and carbon dioxide (a greenhouse gas) emissions by 78%.

Petroleum consumption and greenhouse gas emission reductions for biodiesel blends are proportional; for example, using a 5% blend causes a 4.75% reduction in petroleum consumption and a 3.8% reduction in carbon dioxide emissions. Low-level blends will also cause small reductions in emissions of hydrocarbons, carbon monoxide, particulate matter, and harmful air toxics.

For more information, download the "2004 Biodiesel Handling and Use Guidelines" handbook at www.nrel.gov/vehiclesandfuels/npbf/feature_guidelines.html.

Earning Extra Credit

Under EPA Act, 75% of a state's or 90% of an alternative fuel provider's annual new light-duty vehicle acquisitions must be AFVs, and up to half of the requirement can be met by the use of biodiesel.

For example, if a state fleet purchases 80 light-duty vehicles in a given year, 60 of these vehicles (75%) must be AFVs. The fleet receives 60 credits from the U.S. Department of Energy for these acquisitions. If the fleet acquires a higher proportion of AFVs, the extra credits can be banked for future use or sold or traded to other fleets.

If, in addition to AFV acquisitions, a fleet uses biodiesel in its diesel vehicles, it can gain additional credits. In this example, the fleet could be awarded up to 30 credits (50% of the required 60)—one credit for every 450 gallons of pure biodiesel used. This means that 13,500 gallons of the B100 it uses (or 67,500 gallons of B20) would gain 30 additional credits for the fleet.

Biodiesel credits can be banked, but cannot be traded, sold, or carried over from year to year. However, biodiesel credits can be substituted for acquisition credits, which in turn can be traded or sold.

For more information on credit trading, visit www.eere.energy.gov/vehiclesandfuels/epact/state/credit_trading.shtml.

Use Outside Resources

When it comes to finding outside help in implementing a biodiesel program, MoDOT has an edge. The National Biodiesel Board (NBB) is located in Jefferson City, Missouri, and its resources are readily available to MoDOT. MoDOT fleet managers work closely with NBB staff and benefit from NBB experience in using and storing biodiesel. "It's helped that the NBB is located in Jefferson City; [the association] has provided a lot of help and resources," says Wilson. "In return for NBB's resources and support, MoDOT can test biodiesel for NBB in real-world situations."

Involve Vendors at the Start

When MoDOT began planning its switch to B20, NBB and MoDOT invited biodiesel marketers to a meeting and technical session. Vendors were trained on MoDOT's requirements. Based on what the vendors learned at the meetings, they were able to decide whether they wanted to make the financial commitment involved in bidding for a contract and supplying biodiesel. The meetings also gave MoDOT an opportunity to get to know the vendors with whom they would be working.

Lessons Learned

The greatest obstacles MoDOT faced involve biodiesel quality control and vendor accountability. "We're biodiesel supporters and haven't had a lot of problems, but we've definitely had some issues," says Wilson.

Because MoDOT uses multiple biodiesel vendors in some areas, it has experienced different levels of availability and quality. Due to occasional quality problems,

MoDOT experienced minor engine maintenance issues, probably related to biodiesel's solvent properties. The Jefferson City area obtains the majority of its biodiesel from one supplier and has not experienced the maintenance issues seen in other areas that have multiple suppliers.



Actor and alternative fuels advocate Dennis Weaver fills a MoDOT vehicle with biodiesel.

National Biodiesel Board

MoDOT sees a significant need to develop specifications for B20 and implement stronger quality control measures. It is currently working with the Missouri Department of Agriculture to develop specifications for MoDOT vendors.

Additionally, MoDOT is concerned about the cold-flow issues associated with biodiesel. Although the fleet has not experienced cold-flow problems, it has found that many suppliers won't provide biodiesel during the winter because of these concerns.

Other challenges faced by MoDOT included a fear of the unknown and the difficulty of getting vendors to commit to carrying biodiesel.

What's Next?

Over the next few years, MoDOT intends to expand its biodiesel and AFV program considerably. By July 2005, state legislation will require that 75% of the state's diesel fleet operates on B20. In addition, plans are underway to make B20 available at MoDOT fueling facilities statewide by May 2005.

Other goals include increasing MoDOT employee awareness of alternative fuels and AFVs, increasing the availability of alternative fuels to the fleet, and raising the number of AFVs in the fleet.



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What is EPAAct?

The Energy Policy Act of 1992 (EPAAct) was passed by Congress to reduce the nation's dependence on imported petroleum. Provisions of EPAAct require certain fleets to purchase AFVs. DOE administers these requirements through its State & Fuel Provider Rule, Federal Fleet Rule, and Alternative Fuel Designation Authority.

For more information, visit www.eere.energy.gov/vehiclesandfuels/epact, or call the Regulatory Information Line at 202-586-9171.

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